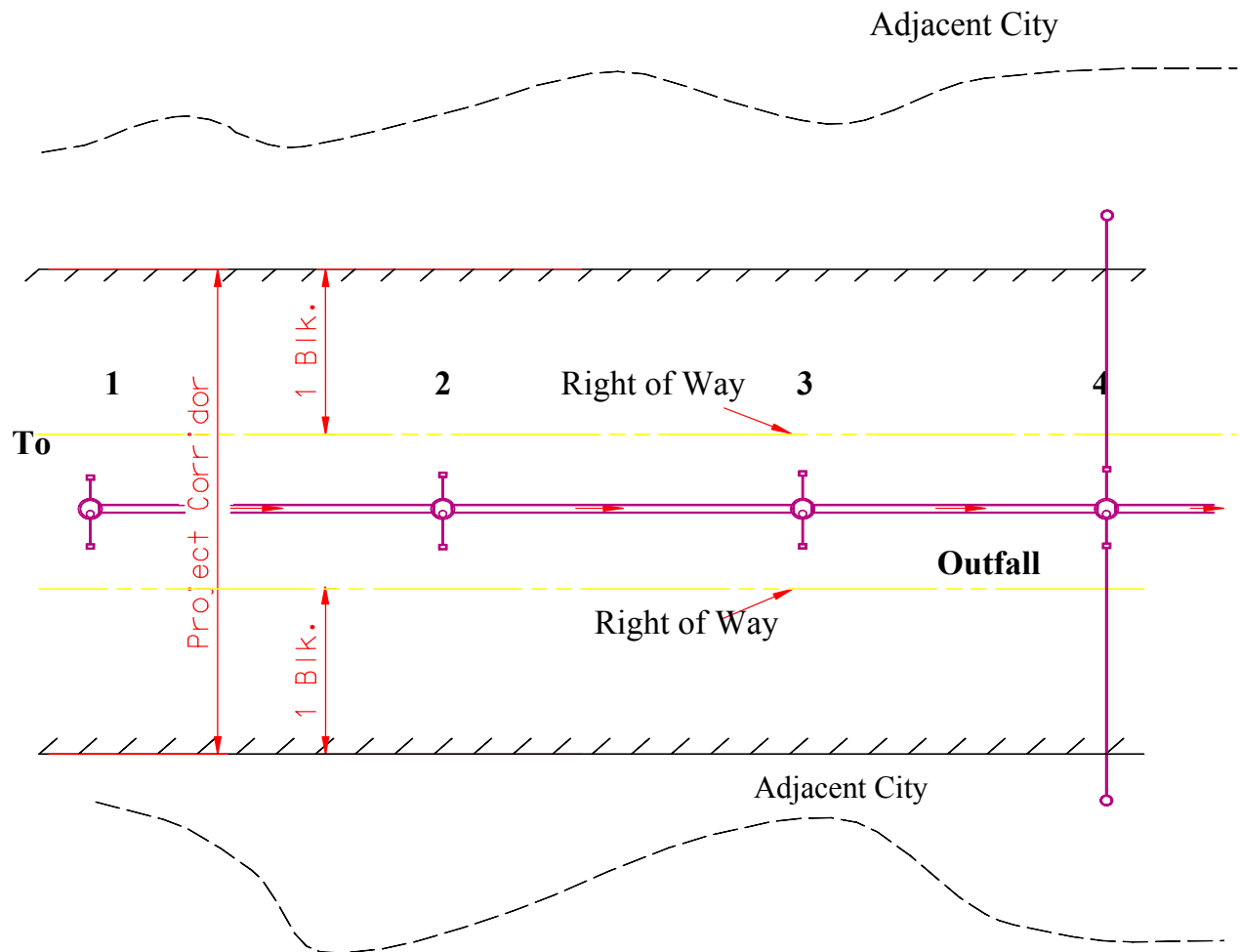


The NDDOT has a policy that enables cities to share drainage costs for **storm drain trunk lines**, whenever it is feasible to combine efforts to drain areas within and outside of the project corridor. The most economical way to accomplish both the Department's and the City's goal for drainage is when each is willing to participate in paying for a single drainage system to avoid duplication of infrastructure elements.

The first step in this process is to determine how much land the highway project is responsible to drain. The general guideline the Department has adopted to define the project corridor is the area that lies within the highway right of way plus one block on either side.

The policy requires that the Department and the City participate in the costs on a percentage basis in proportion to their contribution to the total flow rate, Q . (where Q is the flow rate in cubic feet per second). The General explanation is that the cost sharing is proportional to how much surface water drains from the "project corridor land" versus the water that drains from "city land". The general formula for participation is:

$$Q_{\text{total}} = Q_{\text{project corridor}} + Q_{\text{adjacent city}}$$



There are two cases to consider as follows:

- Case 1. Drainage from an adjacent city area that results in an increased discharge**
In this case the city would participate in the percentage of 'Q' increase for the trunk line cost from the point where city flow joins with project flow to the outfall location.
- Case 2. Drainage from an adjacent city area that does not result in an increased discharge.**
Sometimes drainage from outlying areas does not result in a higher combined discharge. In this case the 'Time of Concentration' factor or the Land Use Runoff factor (c) results in a discharge that is equal to or less than that required for the project corridor only, so the city will not be assessed any additional percentage of cost for the trunk line.

If Case 1 applies the cost breakdown is as follows:

$$\text{Project \%} = \frac{Q \text{ Project Corridor}}{Q \text{ Project Corridor} + \text{Adjacent City}}$$

$$\text{Project Cost (Q Participation)} = (\text{Total Cost}) \times (\text{Project \%})$$

$$\text{City Cost (Q Participation)} = \text{Total Cost} - \text{Project Cost}$$

$$\text{Federal Cost (Project Participation)} = (\text{Project Cost}) \times (\text{Federal \%})$$

$$\text{State Cost (Project Participation)} = (\text{Project Cost}) \times (\text{State \%})$$

$$\text{City Cost (Project Participation)} = (\text{Project Cost}) \times (\text{City \%})$$

$$\text{Total City Cost} = \text{Project Cost (Q Participation)} + \text{City Cost (Project Participation)}$$

Example: The total discharge (Q) computed for the project corridor is 50 cfs to manhole 4. At manhole 4 additional flow is added from an area considered to be 'adjacent city land'. The total 'Q' now is 80 cfs. The funding for this project is 80% Federal, 10% city and 10% State.

Cost of the trunk and lead lines from manhole 1 to manhole 4 is \$ 200,000. The cost of the trunk line from manhole 4 to the outfall is \$ 80,000. The lead line cost from manhole 4 to the outfall is \$ 20,000. Total Cost is \$ 300,000

Find: The cost participation for each governmental entity.

$$\text{Project \%} = \frac{50 \text{ cfs}}{80 \text{ cfs}} = 62.5 \%$$

$$\text{Project Cost (Q participation)} = (80,000)(.625) + 220,000 = \$ 270,000$$

$$\text{City Cost (Q participation)} = 80,000 - 50,000 = \frac{\$ 30,000}{\$ 300,000}$$

$$\text{Federal Cost (Project Part.)} = (50,000)(.80) + (220,000)(.80) = \$ 216,000$$

$$\text{State Cost (Project Participation)} = (50,000)(.10) + (220,000)(.10) = \$ 27,000$$

$$\text{City Cost (Project Participation)} = (50,000)(.10) + (220,000)(.10) = \$ 27,000$$

$$\text{City Cost (Q Participation)} = \frac{\$ 30,000}{\$ 300,000}$$